

## A Development of Environmental Education Teaching Process by Using Ethics Infusion for Undergraduate Students

<sup>1</sup>Prayoon Wongchantra, <sup>1</sup>Pairoj Boujai, <sup>1</sup>Winyoo Sata and <sup>2</sup>Prasat Neungchalerm

<sup>1</sup>Faculty of Environment and Resource Studies,

University of Mahasarakham, Mahasarakham, 44150, Thailand

<sup>2</sup>Faculty of Education, University of Mahasarakham, Mahasarakham, 44150, Thailand

**Abstract:** Environmental problems were made by human beings because they lack environmental ethics. The sustainable solving of environmental problems must rely on a teaching process using an environmental ethics infusion method. The purposes of this research were to study knowledge of environment and environmental ethics through an environmental education teaching process using ethics infusion for undergraduate students, to compare knowledge of environment and environmental ethics of the experimental group and the control group and to compare knowledge of environment and environmental ethics of the group of students with different sexes. The sample consisted of 64th years undergraduate students majoring in environmental technology, the Faculty of Environment and Resource Studies at Mahasarakham university; selected by simple random sampling technique. They were assigned to an experimental group of 30 students who learned using ethics infusion method and the control group of 30 students who learned using the traditional method. The instruments for the study included 4 lessons plans on environment for 4 weeks of teaching, an achievement test and a test on environmental ethics. The collected data were analyzed by the uses of a mean, a standard deviation and the F-test (one-way ANOVA). The major findings revealed the following: The experimental group students and the control group students showed their environmental knowledge at 69.00 and 60.75% of the total score. In addition, the first group indicated their environmental ethics at the level 4 (ethics for goodness) and the latter group at level 3 (ethics for society). The experimental group students showed environmental knowledge as a whole and environmental ethics as a whole and in 4 topics: forest, water resource, rubbish and global warmth more than did the control group students ( $p < 0.05$ ). The female students in the experimental group indicated environmental knowledge and environmental ethics more than did the male students ( $p < 0.05$ ). In conclusion, environmental education teaching process using ethics infusion could develop the students environmental knowledge and environmental ethics at a high level which were greater than the control group. Therefore, the teachers should be supported to implement it in teaching environmental education at the undergraduate level.

**Key words:** Teaching process by ethics infusion method, environmental knowledge environmental ethics and environmental education

### INTRODUCTION

In the present, environmental problems; forest, water resource, rubbish and global warmth had effected to environmental and human being quality. They were understood that many problems were caused they lacked environmental ethics (Vinai, 2003). Many governance organization try to solve those problems with many methods especially environmental education which it is process of environmental teaching for people have environmental knowledge and understanding, awareness, attitude, environmental ethics, behavior and evaluation

(Bhasinee, 2004). Teaching environmental ethics is the important method to solve raising environmental problems and ethics infusion method is good for teaching people especially undergraduate students who are teen-age. They are growth to research in the society.

Therefore, the researcher as a teacher in university had studied a development of environmental education teaching process by using ethics infusion for undergraduate students. It is a experimental research to study development of education in solving environmental problems.

The purposes of this research, were to study knowledge of environment and environmental ethics through an environmental education teaching process using ethics infusion for undergraduate students, to compare knowledge of environment and environmental ethics of the experimental group and the control group and to compare knowledge of environment and environmental ethics of the group of students with different sexes.

## MATERIALS AND METHODS

The sample of this research were 64th years undergraduate students majoring in environmental technology, the Faculty of Environment and Resource Studies at Mahasarakham university; selected by a simple random sampling technique. They were assigned to an experimental group of 30 students who learned using ethics infusion method and the control group of 30 students who learned using the traditional method.

The contents in this teaching of this research were 4 learning plans; forest, water resource, rubbish and global warmth. The ethics infusion in teaching using talking Buddhist novels, comparison the contents, saying good and evil and making examples. The instruments for the study included 4 lessons plans on environmental education for 4 weeks (16 h) of teaching. They were determined by 5 experts which indicate that the total score of plans were the more level ( $\bar{X} = 4.27$ ) to lead in try out with no sample students. The environmental test was designed in 4 contents; forest, water resource, rubbish and global warmth in 4 items multiple choices all together 50 items. They emphasized on knowledge and understanding, analysis, synthetic and application. The researcher had studied how to design the evaluation forms and analyzed the technique in their and took to try out with no 30 sampling random students group, it indicate it was p-value and b-value using in the point Bursarial Correlation by choosing the items with the positive B value and higher than 0.20, B value between 0.26-0.83, p-value between 0.20-0.45, CL value using the formula KR-20 and CL value equal to 0.85. Implement them to the sampling random group. And environmental ethics test was designed in 4 contents; forest, water resource, rubbish and global warmth in 4 items multiple choices all together 40 items. In each item, it was give the score; 1-4 level (no wrong and right). They were examined by the 5 experts for evaluation forms IOC which indicated that they were between 0.50-1.00. Improve and correct them according to the 5 experts' opinion and suggestions and took them to try out with no 30 students sampling random group. Then they were analyzed to collect data in

qualification which indicated that the environmental ethics forms using the B value by coefficient analysis of Pearson's model. Choose the B value which were positive and higher 0.20, B-value between 0.20-0.67. The reliability value using CL-coefficient alpha model by cronbach's method which indicated that CL value of the whole environmental ethics form of 40 items equal to 0.88 which is higher than 0.75 i.e., implement them to the sampling random group.

This research is experimental research as 2 factorial design; teaching method and sex, treatment by randomized posttest-only control group design.

## RESULTS AND DISCUSSION

The major findings revealed the following: The experimental group students and the control group students showed their environmental knowledge of the experimental group students at  $\bar{X} = 27.60$  and the control group students at  $\bar{X} = 24.30$  of the total score (Table 1). In addition, the environmental ethics of the experimental group students at  $\bar{X} = 3.38$ ; the level 4 (ethics for goodness) and the control group students at  $\bar{X} = 2.81$ ; level 3 (ethics for society) (Table 2).

The experimental group students showed environmental knowledge as a whole and environmental ethics as a whole and in 4 topics: Forest, water resource, rubbish and global warmth was more than the control group students ( $p < 0.05$ ) (Table 3).

The female students in the experimental group indicated environmental knowledge and environmental ethics was more than the male students ( $p < 0.05$ ) (Table 4).

From the results of this research, showed that experimental group Students who learned using ethics

Table 1: Environmental knowledge of the experimental group students and the control group students

Environmental knowledge	Experimental group students		Control group students	
	$\bar{X}$	SD	$\bar{X}$	SD
Forest	6.77	1.33	5.97	1.69
Water resource	5.43	1.36	4.50	1.89
Rubbish	7.30	1.56	6.93	2.07
Global warmth	8.10	1.30	6.90	2.76
Total	27.60	2.87	24.30	7.01

Table 2: Environmental ethics of the experimental group students and the control group students

Environmental ethics	Experimental group students		Control group students	
	$\bar{X}$	SD	$\bar{X}$	SD
Forest	3.58 <sup>(4)</sup>	0.28	3.15 <sup>(3)</sup>	0.48
Water resource	3.36 <sup>(4)</sup>	0.33	2.64 <sup>(3)</sup>	0.41
Rubbish	3.36 <sup>(4)</sup>	0.27	2.80 <sup>(3)</sup>	0.39
Global warmth	3.22 <sup>(3)</sup>	0.34	2.66 <sup>(3)</sup>	0.38
Total	3.38 <sup>(4)</sup>	0.19	2.81 <sup>(3)</sup>	0.27

(3) Refer ethics for society, (4) Refer ethics for goodness

Table 3: Comparison of environmental knowledge and environmental ethics of the experimental group students and the control group students

Statistic	Value	Hypothesis df	Error df	F	p
Pillai's trace	0.600	2.000	57.000	42.718	0.000
Wilks' lamda	0.400	2.000	57.000	42.718	0.000
Hotelling's trace	1.499	2.000	57.000	42.718	0.000
Roy's largest root	1.499	2.000	57.000	42.718	0.000

Table 4: Comparison of environmental knowledge and environmental ethics of the experimental group students who were sexes different

Statistic	Value	Hypothesis df	Error df	F	p
Pillai's trace	0.329	2.000	27.000	6.614	0.005
Wilks' lamda	0.671	2.000	27.000	6.614	0.005
Hotelling's trace	0.490	2.000	27.000	6.614	0.005
Roy's largest root	0.490	2.000	27.000	6.614	0.005

infusion method had environmental knowledge. And environmental ethics more than the control group of who learned using the traditional method and the female had environmental knowledge and environmental ethics more than male. The researcher can discuss as follow:

The experimental group students had environmental knowledge and environmental ethics more than the control group students. This can be summarized that process of teaching environmental education using ethics infusion in 4; talking Buddhist novels, comparison the contents, saying goodness and evil and making examples. Talking Buddhist novels about environment which are interesting story. The experimental students' group intended and participated in process of Instruction. They got higher scores the control students' group in congruence with the research of Josiah and Ajitoni (2007) who find that students taught EE concepts using the participatory approaches developed a more positive attitude to the environment, with those in the full participatory group having the best attitude scores which suitable of concept Buddhist novels are the story about natural conservation of people at the past. When they listened them and were happy, funny and interesting so much. They loved natural resource and environment. Which means that teaching as comparison about perfected environment and being environmental problems which students understand the truth of environment especially impact of environmental problems to environmental and human life quality. They got higher scores of environmental knowledge and environmental ethics towards a goodness in environmental conservation and evil of destroy environment which take students understand usage and impact and that this is good and not good. They want to make goodness; environmental

ethics themselves. In congruence with the research of Narumon (2004) who find that examples for environmental conservation are important in teaching students to have environmental ethics such as man who grow the tree, rubbish management and promote about environmental conservation. They can applied in their lives. So, students studied with using ethics infusion, they got higher scores than the control students' group.

The female were environmental knowledge and environmental ethics more than male. This can be summarized that nature of male and female are different in physical, mind, emotion, wisdom, acceptance in many things and training (Mosothwane, 2007). The male were trained to be brave, lead man and freedom more than female. In the addition, male like experiment and show his opinion to public meeting. But female were train to be kind, polite, obey parent and hole community tradition and culture, religion and love about beauty. Because of those reasons, female got environmental knowledge and environmental ethics more than male.

## CONCLUSION

From this research, we found that environmental education teaching process using ethics infusion could develop the students environmental knowledge and environmental ethics at a high level which were greater than the control group. Therefore, the teachers should be supported to implement it in teaching environmental education at the undergraduate level.

## RECOMMENDATIONS

In this research, were to take ethics infusion using with female and find others fore male. We should teach this ethics infusion with students in high school and compare other variables such as students' parent occupation, income and students' place of birth. And we study in quality research with instrument such as interview and observation students' behavior.

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